

REMARKS

The specification has been amended to correct a typographical error. Claims 1, 11, 12, 14, 22, 23, 25, 33, 34, and 36 have been amended to clarify the invention. Claims 1-4, 6-15, 17-26, and 28-39 remain pending.

The Examiner rejected claims 1-4, 6-15, 17-26, and 28-39 under 35 U.S.C. §103(a) as being unpatentable over Crump et al. (U.S. 6,892,245) in view of Gelb (U.S. 5,550,984) further in view of Aysan et al. (U.S. 2003/0108041). The Examiner's rejections are respectfully traversed as follows.

Claim 1 is directed towards a “method for performing network address translation on data.” Claim 1 also recites “receiving a first data having a first source address and a first destination address, wherein the first data is sent by a first node in a first domain to a second node in a second domain, and wherein the first data is received into a first interface associated with the first domain and output from a second interface associated with the second domain, and wherein the first domain differs from the second domain.” Claim 1 also recites “wherein the first and second interfaces are virtual interfaces that are each configurably associated with one or more domains.” Claim 1 also recites “if the first source address is a private address and if a binding between the first source address, the first interface, and a first public address is not found, translating the first source address into a selected public address and forming and storing a first binding between the first source address, the selected public address, and the first interface.” That is, if a binding between a public address, private address and **virtual** interface of the received data is not found, such a binding is formed. Claim 1 further requires “if the first source address is a private address and if a binding between the first source address, the first interface, and a first public address is found, translating the first source address into the first public address specified by the found binding prior to sending the first data to the second domain destination.” Once this binding between a private address, public address, and **virtual** interface is formed, it is then used to perform NAT translation based on a public address, private address, and a **virtual** interface that is associated with the received data. The remaining independent claims include mechanisms for performing the same operations as claim 1.

Basing NAT operations on a virtual interface has several associated advantages. For instance, a virtual interface can flexibly be associated with any number of interfaces and corresponding domains. One example of this arrangement is shown in Figure 7, which illustrates a plurality of interfaces associated with each NAT virtual interface (or NVI). Other advantages are described below and specified with respect to claims 11 and 12, among other places.

The primary reference Crump fails to teach or suggest mechanisms for forming and using a binding between a private address, a public address and a virtual interface, in the manner claimed. Although Crump appears to perform a NAT operation based on a mapping to a domain identifier of the destination domain (see Col. 9, Lines 9-15 and Col. 10, Lines 42-46), Crump does not appear to teach or suggest performing a NAT operation based on a mapping to a virtual interface, in the manner claimed. Crump does not have any teachings or enablement regarding virtual interfaces. A description of such a technique for utilizing NAT virtual interfaces as it pertains to one embodiment of the claimed invention is provided on page 19, line 16 of the specification and Figure 7. As described and illustrated, each NAT virtual interface may be configurably associated with one or more interfaces and associated one or more networks by forming or dismantling differently configured NAT virtual interfaces. However, Crump fails to teach, suggest, or enable NAT operations based on a binding between a local address, public address, and a virtual interface, in the manner claimed.

It is also respectfully submitted that the secondary references have the same deficiencies. The secondary reference Gelb is cited as disclosing forming a binding between a private address, an interface, and a public address. However, the cited portions of Gelb merely refer generally to “software used to bind a network interface adapter (22) to the Internet or other private network. See Col. 5, Lines 28-30 (Emphasis added). At most, this binding is between an interface and a single network, rather than between a virtual interface, a private address, and a public address, in the manner claimed. This binding software is described as providing an address that allows a public user to find and attach to the front end of the security system. Supra Lines 31-32. This cited passage fails to teach or suggest forming a binding between a virtual interface, a private address, and a public address and use of such binding, in the manner claimed.

The secondary reference Aysan is cited as teaching a technique for translating an address based on a binding between an interface, a private address, and a public address of a particular node. Aysan appears to teach using interface addresses for routing purposes, rather than for performing translation of source or destination addresses. Aysan also fails to teach or suggest forming or using a binding between a virtual interface, a private address, and a public address, in the manner claimed. In the portions cited by the Examiner, Aysan starts by teaching a mapping between a private and public address (as defined in an ARP table) that are shared with routers in a particular VPN, and various components of this VPN are described. See paragraph [0042]. Specifically, Aysan teaches a network interface 310, that receives a packet from a particular source having a private address (see paragraph [0045]), then “proceeds to look up (step 806) the private destination address 714 (10.20.1.1) in a routing table to learn that the packet should be sent to the remove CVR tunnel interface 412, which ...has an address of 10.1.2.1.” See paragraph [0046]. Aysan notes that the ARP table also associates the addresses of particular

interfaces, such as BR tunnel interface 314A and local CVR tunnel interface 312. See paragraph [0048]. The received packet is encapsulated with the addresses of the routing interfaces. See paragraph [0049]. The source address (or any other address) of the packet is not translated based on a binding between a virtual interface, a private address, and a public address, in the manner claimed. Additionally, Aysan fails to teach forming such a binding between a virtual interface, a private address, and a public address, in the manner claimed.

Accordingly, it is respectfully submitted that independent claims 1, 14, 25, and 36 are patentable over the cited references.

The Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-4, 6-13, 15, 17-24, 26, 28-35, and 37-39 each depend directly or indirectly from independent claims 1, 14, 25, or 36 and, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claims 1, 14, 25, or 36. Further, the dependent claims require additional elements that when considered in context of the claimed inventions further patentably distinguish the invention from the cited art.

For example, claim 11 recites "wherein each virtual interface defines which interfaces may communicate with which other interfaces." In a further aspect, claim 12 recites "wherein each virtual interface defines which interfaces can communicate with which other interfaces by specifying interface as belonging to one or more groups so that a particular interface is specified as being allowed to communicate with another interface if the particular interface and other interface belong to a same group." All of the cited references appear to be silent with respect to the use of virtual interfaces so as to specify which interfaces can communicate with each other, in the manner claimed.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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